Mathematics Lesson Plan
Making a Star Quilt

Montana Office of Public Instruction
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www.opi.mt.gov/IndianEd

Created by Erin Glennie

Grade 6: Duration 2 - 50 minute periods
Stage 1 Desired Results

Established Goals:

Montana Content Standards: Montana Standard 4 Benchmark 4 - Students demonstrate understanding of shape and an ability to use geometry

Essential Understanding 1: There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each nation has a distinct and unique cultural heritage that contributes to modern Montana.

Understandings:	Essential Questions:
1. The Assiniboine and Sioux tribes of northeastern Montana mark important events through a Star quilt ceremony. 2. When making a Lone Star quilt, precision in cutting or folding is crucial. 3. Geometric principles are involved.	1. What is the background of the Star quilt? 2. How will the look of a quilt be affected if you don't use accurate measuring in your cutting or folding?
Students will be able to…	Students will know…
1. Use research skills to learn about the traditions of the Assiniboine and Sioux Star quilt ceremony. 2. Explain what a person might see at a Star quilt ceremony. 3. Review geometric properties, i.e. parallel and perpendicular lines, parallelograms (specifically a rhombus), symmetry, supplementary and complementary angles, etc. 4. Construct a Lone Star quilt block by folding paper into rhombi, and piecing them together.	1. The importance of precise and accurate angle measurement when folding the pieces of the quilt. 2. How to fold a rhombus to be used as a pattern. 3. The meaning of the Star quilt and the ceremony where it is presented.

Stage 2 Assessment Evidence

Performance Tasks:

*Create a Star quilt block by using rhombus pattern. Use this to trace and cut the number of rhombi needed to complete each quilt (pre-plan the size and difficulty level desired). Place the pieces as desired before gluing.

*Present/display individual quilt blocks.

Other Evidence:

*Oral discussion of geometric vocabulary used for this project.

*Neatness/accuracy in constructing the quilt block.

*Verbal response to the Essential Questions.

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Stage 3 Learning Plan

1. The students will begin this lesson by researching the importance of a traditional Star quilt ceremony. Direct them to find out why star quilts are given, what they represent, and who might be the lucky recipient. If you are short on time, the teacher should provide them with the important information. *See attached Resource Page*.

2. Bring in or show pictures of Star quilts to show the students how beautiful the colors and details are. The teacher can refer to the quilt(s) when reviewing the geometric principles involved in making the quilt. After showing a star quilt, ask the following questions:
    a. What are some geometric shapes that you see in the star quilt? (rhombi, triangles)
    b. What basic shape was used to construct the star? (rhombi)
    c. What do you know about a rhombus? (parallelogram with 2 consecutive equal sides)

3. Review/introduce the basic geometric terms evident in a star quilt:
    a. What are parallel lines? Can you find an example of parallel lines?
    b. Does the star quilt have a line of symmetry? (yes)
    c. How many lines of symmetry does it have? (8)
    d. Use the pattern to draw in all of the lines of symmetry.
    e. Does the star quilt have rotational symmetry? (yes)

4. Look at several examples of quilts to view color options and difficulty levels. Some students may want to limit theirs to 3 colors.
    http://www.art.mt.gov/folklife/folklife_quilt.asp
    http://americanindian.si.edu/education/files/quilts.pdf
    http://www.montanaquilts.com/st_book.htm

5. Have students select colors to be used for the quilt blocks. Provide each with a straightedge, scissors, glue, and a template to piece the quilt.

6. Demonstrate how to fold paper into a rhombus (directions found on **resource page**). At this point your students could use a protractor to measure the angles. You could also label the interior angles and discuss concepts such as vertical, supplemental and complementary angles.

7. Trace and cut as many rhombi needed to fill in the planned Star quilt. Begin piecing on background paper (before gluing) and mention to students the importance of precise cutting.

8. When satisfied with appearance, begin gluing onto background paper. For those who finish early,

they could look at adding more detail (such as a border).

9. Have students present quilt blocks and explain why they chose the colors they did or something they learned during the lesson.

Teacher's Resource Page

Materials/Resources Needed:

To fold a rhombus:
1. Depending on how big/elaborate you want your quilt to turn out, use scratch paper to make your pattern.
2. Make a perfect square by folding and cutting (a 4" x 4" or smaller is suggested). Make sure you can see your diagonal fold.
3. Hold your bottom left vertex (where your diagonal starts) and bring the bottom right vertex to the diagonal; crease and leave folded.
4. Fold your top left vertex down to the diagonal; crease and leave folded. (Is it looking like a kite?)
5. Fold outside vertices into the diagonal to form a rhombus. This will be your basic pattern for creating the star quilt. You may adjust the size if desired.

Here are some sites used when creating this lesson. They offer valuable background information and quilt examples. Please feel free to check them out!
http://www.fullcirclecm.org/lesson_materials/star-quilts.php

Similar lesson plan offered through Simms Integrated Math (Level 2), Copyright date 2003, by Kendall/Hunt Publishing Company.
http://www.kendallhunt.com/samples/157.pdf

Extension Ideas:

1. Since traditionally the Star quilt is associated with the Assiniboine and Sioux tribes, students could research other tribal customs and compare/discuss.
2. Students could make an actual quilt square to display.
3. Complete area and perimeter activities, i.e. find both, look for a relationship of the perimeter and area of the rhombus pattern to the finished quilt.